AMENDMENTS TO THE CLAIMS

Claims 1-7 (Canceled)

8. (Previously presented) The method of Claim 21, wherein N is less than approximately 50,000.

9. (Previously presented) The method of Claim 21, wherein N is less than approximately 10,000.

10. (Previously presented) The method of Claim 21, wherein N is less than approximately 1,000.

11. (Previously presented) The method of Claim 21, wherein N is greater than approximately 10.

12. (Previously presented) The method of Claim 21, wherein N is greater than approximately 100.

13. (Previously presented) The method of Claim 21, wherein a diameter D_i of any one nanochannel is substantially equal to a diameter D_j of any other nanochannel.

14. (Previously presented) The method of Claim 21, wherein D is greater than approximately 1 nanometer and less than approximately 900 nanometers.

15. (Previously presented) The method of Claim 21, wherein D is greater than approximately 5 nanometers and less than approximately 750 nanometers.

16. (Previously presented) The method of Claim 21, wherein D is greater than approximately 10 nanometers and less than approximately 500 nanometers.

17. (Previously presented) The method of Claim 21, wherein D is greater than approximately 40 nanometers and less than approximately 250 nanometers.

Claims 18-20 (Canceled)

21. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein the nanochannels are substantially straight and substantially parallel to one another, wherein N is less than approximately 100,000, and wherein the member is in fluid communication with the electrolyte solution;

filling said chamber with said reference electrolyte solution, said reference electrolyte solution having a viscosity η;

pressurizing the electrolyte solution to a pressure P_E;

configuring the reference electrode such that the liquid junction member can be brought into fluid communication with a sample solution such that the junction member is situated between the electrolyte solution and the sample solution; and

selecting ΔP, D, η, and L such that $\frac{D^2 \Delta P}{32\eta L}$ is greater than about 0.1 centimeter per second, wherein ΔP is a pressure differential between P_E and a pressure P_S of the sample solution, and wherein ΔP is greater than approximately 10 psi and less than approximately 100 psi.

Claims 22-23 (Canceled)

24. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately 100,000, wherein the member is in fluid communication with the electrolyte solution, and wherein the nanochannels are coated with a hydrophilic material.

25. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately 100,000, wherein the member is in fluid communication with the electrolyte solution, and wherein the nanochannels are coated with a hydrophobic material.

26. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately 100,000, wherein the member is in fluid communication with the electrolyte solution, and wherein the junction member is manufactured as a single planar element.

Claims 27-29 (Canceled)

30. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately

100,000, wherein the member is in fluid communication with the electrolyte solution, and wherein the junction member comprises a planar element of microchannels coupled to a planar element of nanochannels.

31. (Original) The method of Claim 30, wherein the planar element of microchannels is bonded to the planar element of nanochannels.

32. (Original) The method of Claim 30, wherein the planar element of the microchannels is thermally or adhesively bonded to the planar element.

33. (Original) The method of Claim 30, wherein the microchannels have widths greater than approximately 5 micrometers and less than approximately 25 micrometers.

34. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member made of a polymer and having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately 100,000, and wherein the member is in fluid communication with the electrolyte solution;

filling said chamber with said reference electrolyte solution, said reference electrolyte solution having a viscosity η;

pressurizing the electrolyte solution to a pressure P_E;

configuring the reference electrode such that the liquid junction member can be brought into fluid communication with a sample solution such that the junction member is situated between the electrolyte solution and the sample solution; and

selecting ΔP, D, η, and L such that $\frac{D^2 \Delta P}{32 \eta L}$ is greater than about 0.1 centimeter per second, wherein ΔP is a pressure differential between P_E and a pressure P_S of the sample

solution, and wherein ΔP is greater than approximately 10 psi and less than approximately 100 psi.

35. (Original) The method of Claim 34, wherein the polymer is selected from the group consisting of polycarbonate, polyethylene, and polyimide.

36. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member made of silicon, glass, or ceramic, and having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately 100,000, and wherein the member is in fluid communication with the electrolyte solution;

filling said chamber with said reference electrolyte solution, said reference electrolyte solution having a viscosity η;

pressurizing the electrolyte solution to a pressure P_E;

configuring the reference electrode such that the liquid junction member can be brought into fluid communication with a sample solution such that the junction member is situated between the electrolyte solution and the sample solution; and

selecting ΔP, D, η, and L such that $\frac{D^2 \Delta P}{32 \eta L}$ is greater than about 0.1 centimeter per second, wherein ΔP is a pressure differential between P_E and a pressure P_S of the sample solution, and wherein ΔP is greater than approximately 10 psi and less than approximately 100 psi.

37. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately 100,000, and wherein the member is in fluid communication with the electrolyte solution;

filling said chamber with said reference electrolyte solution, said reference electrolyte solution having a viscosity η;

providing means for pressurizing the electrolyte solution;

pressurizing the electrolyte solution to a pressure P_E;

configuring the reference electrode such that the liquid junction member can be brought into fluid communication with a sample solution such that the junction member is situated between the electrolyte solution and the sample solution; and

selecting ΔP, D, η, and L such that $\frac{D^2 \Delta P}{32\eta L}$ is greater than about 0.1 centimeter per second, wherein ΔP is a pressure differential between P_E and a pressure P_S of the sample solution, and wherein ΔP is greater than approximately 10 psi and less than approximately 100 psi.

38. (Original) The method of Claim 37, wherein the means for pressurizing is selected from the group consisting of a pressurized collapsible bladder, an electro-osmotic pump, a mechanical pump, a piezo-electric pump, and a electro-hydrodynamic pump.

Claims 39-40 (Canceled)

41. (Previously presented) A method of manufacturing a flowing junction reference electrode, the method comprising:

providing a chamber for receiving a reference electrolyte solution, wherein the chamber is configured to allow pressurization of the electrolyte solution; and

providing a liquid junction member having N discrete nanochannels, the nanochannels having diameters D and lengths L, wherein N is less than approximately 100,000, and wherein the member is in fluid communication with the electrolyte solution;

filling said chamber with said reference electrolyte solution, said reference electrolyte solution having a viscosity η;

pressurizing the electrolyte solution to a pressure P_E;

configuring the reference electrode such that the liquid junction member can be brought into fluid communication with a sample solution such that the junction member is situated between the electrolyte solution and the sample solution;

selecting ΔP, D, η, and L such that $\frac{D^2 \Delta P}{32\eta L}$ is greater than about 0.1 centimeter per second, wherein ΔP is a pressure differential between P_E and a pressure P_S of the sample solution, and wherein ΔP is greater than approximately 10 psi and less than approximately 100 psi; and

providing a sensing electrode.

42. (Original) The method of Claim 41, wherein the sensing electrode is selected from the group consisting of pH electrodes, other ion-selective electrodes, and redox electrodes.